
The Atomic Bomb invention

60 million dead men, women and children. World War II was simply the bloodiest war the world has ever known, with no prior war being so profound in its technological advancements to the point where it is still relevant today. Numerous inventions were made, including rocketry, the jet engine, radar and even the first computer but one invention that triumphed them all was the first atomic bomb. This super weapon today can destroy the world as we know it, and send us into the next ice age. Being so, the development and usage of the first atomic bombs caused a change in military, politics and public functionality that we can still see in our world today.

During World War II the United States government launched a \$2 billion project. This project, known as the Manhattan Project which lasted from (1939-1946), was an effort to produce an atomic bomb. This project was only possible due to the fact with the breakthrough of fission in 1939, scientists figured out that nuclear and radioactive materials could be used to make bombs of epic proportions. The idea of building such a weapon originated from Albert Einstein, sharing his idea with President.

"In the fall of 1939, Albert Einstein sent a letter to President Franklin D. Roosevelt, alerting him to the great potential for the peaceful use of atomic energy. He also warned him of the devastating consequences if Hitler's scientists succeeded in building an atomic bomb before the Americans. Roosevelt understood Einstein's warning immediately. "What you are after is to see that the Nazis don't blow us up." Roosevelt replied. "This requires action.""(Relin,1992) Roosevelt quickly assigned his top security advisors to form committees on this project, and to determine what should be done and how. In 1944, work on the Manhattan Project was in full throttle. The process was to achieve the actual development of the weapons, fissile matter construction, and the transportation of the weapon.

In July 1944, the Manhattan Project achieved first priority project in the United States. The project cost 2 billion dollars in order to obtain the necessary materials and equipment in order to make the Manhattan Project a success. The Manhattan Project had many laboratories across the United States, but three of the main ones were located in Hanford, Washington, Los Alamos, New Mexico, and Oak Ridge, Tennessee. Each of these was provided with different responsibilities throughout the Manhattan Project. The laboratories at Oak Ridge were to provide the element of Uranium-235, while the scientist at Hanford were providing the United States with plutonium used for weapons.

The Los Alamos laboratory was the essential site used to put together the nuclear weapons used to the war. Four of the atomic bombs that were produced by the United States were produced at Los Alamos, New Mexico. Uranium-235 is the main component in making an atomic bomb. Chemically, uranium-235 cannot be separate from its more profuse cohort, uranium-238. The only way that these two elements can be separated from one another is physically.

The Manhattan Project looked for many different means in splitting the two elements, deciding on two of the processes. One mean of splitting the two elements is by the electromagnetic process. The other was process is the process of diffusion was made available at Columbia University. Both of the processes mentioned require huge, difficult facilities and buildings, and

the processes both require extreme usages of electricity in order to achieve the processes. The diffusion method particularly needed large amounts of electricity in order to be successful.

“During the World War 11 Manhattan Project, over 14,000 tons of silver borrowed from the U.S. Treasury were used to create magnet coils used in the separation of Uranium-235”(History of science and technology,2012).Another essential element in the atomic bomb making process is plutonium-239. The method for obtaining this element was produced by Arthur Compton at a laboratory at the University of Chicago. The procedure involves the alteration in a reactor mound of uranium-238.

In December 1942, Enrico Fermi eventually achieved in making and managing a fission chain reaction in this reactor pile in Chicago. Value production of plutonium-293 required the building of large size and energy that would discharge 25,000 kilowatt-hours of heat for each gram of plutonium that was made. It included the making of chemical removal methods that would work in a way that was never done before. A middle step in making this process was based solely on the production of the laboratory at Oak Ridge, while the larger reactors were being built at the laboratory in Washington at the Hanford Engineering Works.

During the summer of 1945, the Manhattan Project finally received enough plutonium-239 in order to produce a quality nuclear explosion from Hanford Engineering. The advancement in the development of the weapons and the innovation of the design of the weapon, along with obtaining the necessary elements for the nuclear bomb were completed enough to where a test of the nuclear weapon could be planned. The test was not simple to achieve, having to obtain complicated and highly structured equipment that had to be constructed and an area where no one for hundreds of miles could get hurt.

In 1945, the Manhattan Project achieved its goal of producing an atomic bomb. After six years, the scientists working on the Manhattan Project were able to harness and control the reaction of nuclear fission. With the efforts of many individuals throughout these years, the first nuclear test bomb was produced. With the code name Trinity, the first nuclear bomb test went off on July 16, 1945 in New Mexico, which lead into what is now known as the Atomic Age. After the successful bomb testing, nearly seventy scientists had signed a petition for the bombs not to be used on the grounds of morals and ethics. The scientists did not morally believe that the nuclear weapons should be ever used. However, President Harry S. Truman ignored the warnings and the petitions of the scientists and decided to use the bombs on Japan in order to send them a message that the United States had these weapons and were willing to use them.

On August 6, 1945, near the end of World War II, the United States dropped the first nuclear bomb ever used in warfare. The United States used a B-29 bomber in order to drop an atomic bomb by the name of "Little Boy" on the city Hiroshima.“ The bomb exploded with the energy equivalent of approximately 13 kilotons of TNT. The total death toll was estimated at 192,020, including those who died later due to the aftereffects of the blast”(Askew,2017).When Japan's surrender never came, just three days after the bombing of Hiroshima a 21-kiloton plutonium bomb known as "Fat Man" was dropped. On the day of the bombing, an estimated 263,000 were in Nagasaki, including 240,000 Japanese residents, 9,000 Japanese soldiers, and 400 prisoners of war. Prior to August 9, Nagasaki had been the target of small scale bombing by the United States. Though the damage from these bombings was relatively small, it created considerable concern in Nagasaki and many people were evacuated to rural areas for safety, thus reducing the population in the city at the time of the nuclear attack. It is estimated that

between 40,000 and 75,000 people died immediately following the atomic explosion, while another 60,000 people suffered severe injuries. On August 10th, 1945, Japan surrendered thus ending World War II.

The release of two atomic bombs on Japan in August 1945 helped end World War II but ushered the Cold War, a conflict between the United States and the Soviet Union that dragged on nearly half a century. Shortly after the bombings of Japan, the Soviet Union began taking great strides to try and become the world's next nuclear power. With the information provided by Manhattan Project scientist and Soviet spy Klaus Fuchs, "Between 1945 and 1947, working with a courier code-named Raymond, Fuchs delivered high-level information to Moscow about the atomic bomb, then later the hydrogen bomb." (Long, 2017). And the information confiscated from the Germans, the Soviets were well on their way to building their own nuclear arsenal. This created a security dilemma between the United States and the Soviet Union, and for decades after World War II, both countries directed incredible amounts of money and resources towards increasing the size of their arsenals.

On August 29th, 1949, the Soviet Union detonated its first atomic bomb, at the Semipalatinsk Test Site in Kazakhstan. This event ended America's monopoly of atomic weaponry and launched the Cold War. "In the 1950's, The Arms Race became the focus of the Cold War. America tested the first Hydrogen (or thermo-nuclear) bomb in 1952, beating the Russians in the creation of the "Super Bomb" (The Cold War). The ever-present threat of nuclear annihilation had a great impact on American domestic life as well. There was the constant fear of when will war break loose between the two super powers. People built bomb shelters in their backyards. They practiced attack drills in schools and other public places. The 1950s and 1960s saw an epidemic of popular films and propaganda that horrified the American with depictions of nuclear devastation and mutant creatures. In these and other ways, the Cold War was a constant presence in Americans' everyday lives.

In the end the atomic bomb was the biggest and most devastating invention in the last century, Setting stepping stones for genocide and wars to come. It was the first and last time a nuclear weapon was used in warfare, and to this very day there is the constant fear that all life on earth could be annihilated by the push of a button.